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| Chapter 17 Mixed Review*Match each item with the correct statement below.*

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| --- | --- | --- | --- |
| a. | heat of reaction | f. | heat of vaporization |
| b. | heat of formation | g. | heat of condensation |
| c. | exothermic reaction | h. | heat capacity |
| d. | heat of fusion | i. | specific heat |
| e. | heat of solution | j. | endothermic reaction |

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| 1. \_\_\_\_\_\_\_the enthalpy change for a chemical reaction exactly as it is written  |
| 2. \_\_\_\_\_\_\_the enthalpy change caused by dissolving a substance  |
| 3. \_\_\_\_\_\_\_the energy required to melt a solid at its melting point  |
| 4. \_\_\_\_\_\_\_the change in enthalpy that accompanies the formation of a compound from its elements  |
| 5. \_\_\_\_\_\_\_a chemical reaction that gives off heat  |
| 6. \_\_\_\_\_\_\_a chemical reaction that absorbs heat  |
| 7. \_\_\_\_\_\_\_the energy required to turn a liquid into a gas  |
| 8. \_\_\_\_\_\_\_the energy given off when a gas turns into a liquid  |
| 9. \_\_\_\_\_\_\_The amount of heat needed to increase the temperature of an object exactly 1°C  |
| 10. \_\_\_\_\_\_\_The amount of heat needed to increase the temperature of 1 g of a substance 1°C  |
|  |
| *Classify each of these statements as true or false*. **11.** Δ*H*fus = – Δ*H*solid **12.** Melting and vaporization are exothermic processes. **13.** In order to convert 1 mole of H2O(*l*) to 1 mol of H2O(*g*), 40.7 kJ must be supplied. **14.** As ice melts, the temperature of the ice increases until the entire sample becomes liquid. **15.** When ammonium nitrate dissolves in water, the solution gets cold. This is an example of an exothermic reaction.**\_\_\_\_\_\_\_\_16.** The sign of Δ*H* is negative for an exothermic reaction.**\_\_\_\_\_\_\_\_17.** If 129 kJ of heat is required to decompose 2 moles of NaHCO3, then 258 kJ is required to decompose 4 moles of NaHCO3. **18.** The physical state of the reactants and products in a thermochemical reaction are not important when calculating Δ*H* of the reaction. **19.** In endothermic reactions, the potential energy of the product(s) is higher than the potential energy of the reactants. **20.** The equation CaO(*s*) + H2O(*l*) → Ca(OH)2(*s*) Δ*H* = 65.2 kJ is an example of a thermochemical equation. |
|  21.  | In an exothermic reaction, the energy stored in the chemical bonds of the reactants is \_\_\_\_.

|  |  |
| --- | --- |
| a. | equal to the energy stored in the bonds of the products |
| b. | greater than the energy stored in the bonds of the products |
| c. | less than the energy stored in the bonds of the products |
| d. | less than the heat released |

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|  22.  | A process that releases heat is a(n) \_\_\_\_.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | polythermic process | c. | ectothermic process |
| b. | exothermic process | d. | endothermic process |

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|  23.  | What is the amount of heat required to raise the temperature of 200.0 g of aluminum by 10mc013-1.jpgC? (specific heat of aluminum = 0.21cal/ g C )

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| --- | --- | --- | --- |
| a. | 420 cal | c. | 42,000 cal |
| b. | 4200 cal | d. | 420,000 cal |

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|  24.  | Which of the following is a valid unit for specific heat?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | mc014-1.jpg | c. | mc014-2.jpg |
| b. | cal | d. | mc014-3.jpgC |

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|  25.  | How can you describe the specific heat of olive oil if it takes approximately 420 J of heat to raise the temperature of 7 g of olive oil by 30mc015-1.jpgC?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | greater than the specific heat of water | c. | equal to the specific heat of water |
| b. | less than the specific heat of water | d. | Not enough information is given. |

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|  26.  | What does the symbol mc016-1.jpg*H* stand for?

|  |  |
| --- | --- |
| a. | the specific heat of a substance |
| b. | the heat capacity of a substance |
| c. | the heat of reaction for a chemical reaction |
| d. | one Calorie given off by a reaction |

  |
|  27.  | What is the standard heat of reaction for the following reaction?Zn(*s*) + Cumc017-1.jpgmc017-2.jpg(*aq*) mc017-3.jpg Znmc017-4.jpg(*aq*) + Cu(*s*)(mc017-5.jpg*Hmc017-6.jpg* for Cumc017-7.jpg = +64.4 kJ/mol; mc017-8.jpg*Hmc017-9.jpg* for Znmc017-10.jpg = –152.4 kJ/mol)

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 216.8 kJ released per mole | c. | 88.0 kJ absorbed per mole |
| b. | 88.0 kJ released per mole | d. | 216.8 kJ absorbed per mole |

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|  28.  | Which of the following is NOT a form of energy?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | light | c. | heat |
| b. | pressure | d. | electricity |

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|  29.  | Which of the following is transferred due to a temperature difference?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | chemical energy | c. | electrical energy |
| b. | mechanical energy | d. | heat |

 30. The specific heat capacity of graphite is 0.71 sa021-1.jpg. Calculate the energy required to raise the temperature of 750 g of graphite by 160sa021-2.jpgC31. How much heat is released when 50g of ammonia (NH3) freezes?32. How much heat is required to raise the temperature of 8.4 sa023-1.jpg 10sa023-2.jpg g of aluminum by 42sa023-3.jpgC? (specific heat of aluminum = 0.21 cal /gC )33. If 500 g of iron absorbs 22,000 cal of heat, what will be the change in temperature? (specific heat of iron = 0.11 cal/g C)34. When ethanol, C2H6O(l), burns, it reacts with O2(g) to produce CO2(g) and H2O(l) and 1368kJ of heat is released. Write the balanced thermochemical equation for this reaction.**35.** How much heat is absorbed when 63.7 g of H2O(*l*) at100°C and 101.3kPa is converted to gas at 100°C? Express your answer in kJ. ∆Hvap = 40.7kJ/mol**36.** How many kilojoules of heat is absorbed when 0.46g of chloroethane (C2H5Cl, bp 12.3⁰C) vaporizes at its normal boiling point? The molar heat of vaporization of chloroethane is 24.7kJ/mol. |